



COMMUNICATION MEDIA COMPONENTS GROUP

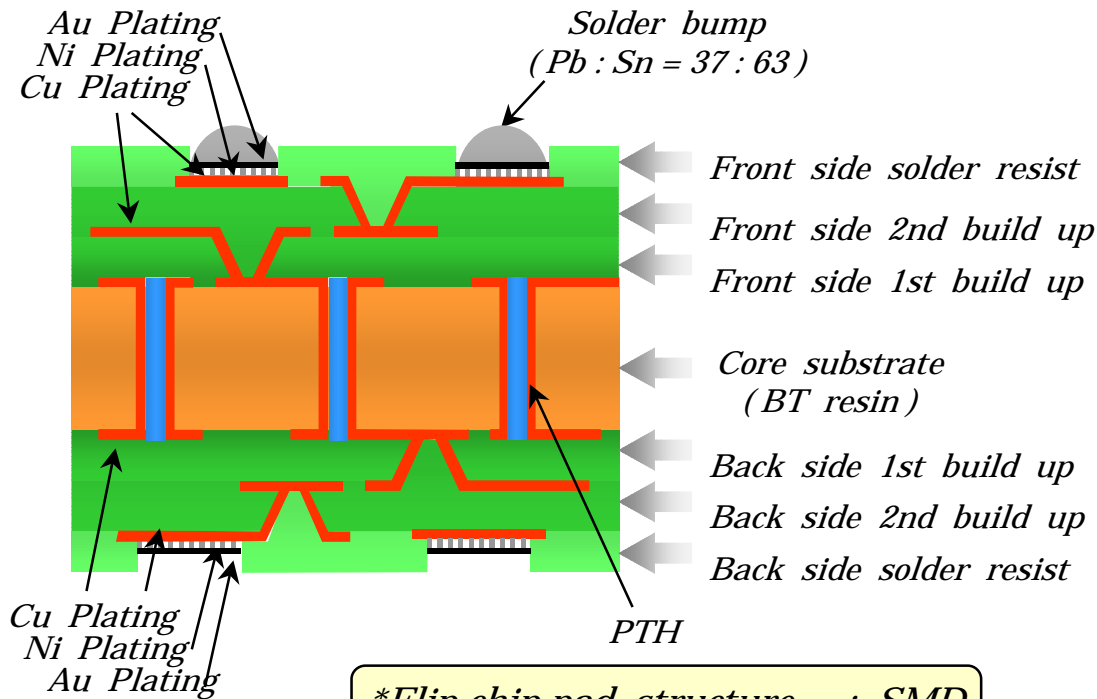
NGK SPARK PLUG CO.,LTD.
2808,IWASAKI,KOMAKI,AICHI,485,JAPAN



Organic Package
Design Rule (General)
Rev.0

Typical structure

Structure section view



*Flip chip pad structure : SMD
*BGA pad : SMD

Layer thickness (Typical)

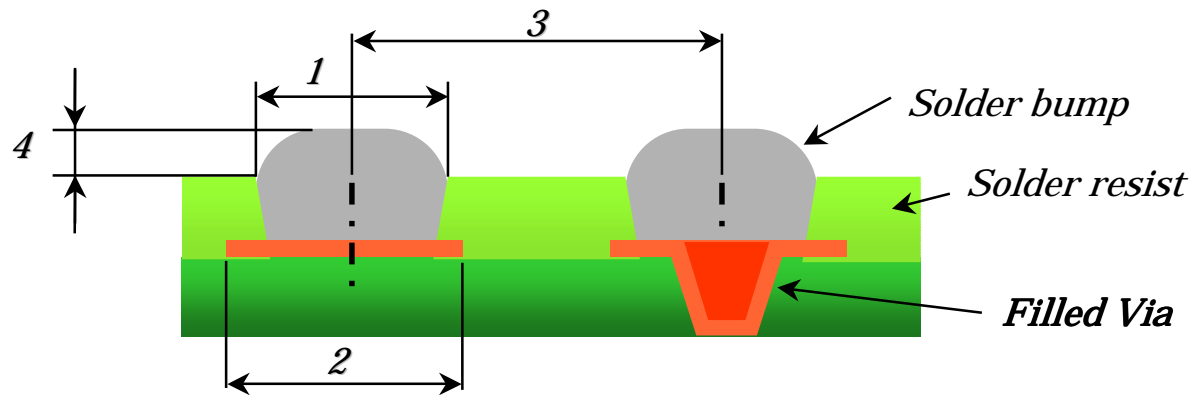
Location	Thickness (um)
Core substrate	800
Core Cu	25
Build up Cu	14.5
Insulation layer	33
Solder Resist layer	21
Nickel plating	3~7
Gold plating	0.03~0.12

Number of layer

Number of build up layer	1, 2, 3, 4 / Side
Number of Core layer	2, 4

Flip chip pad design rule

**Flip chip pad structure : SMD*



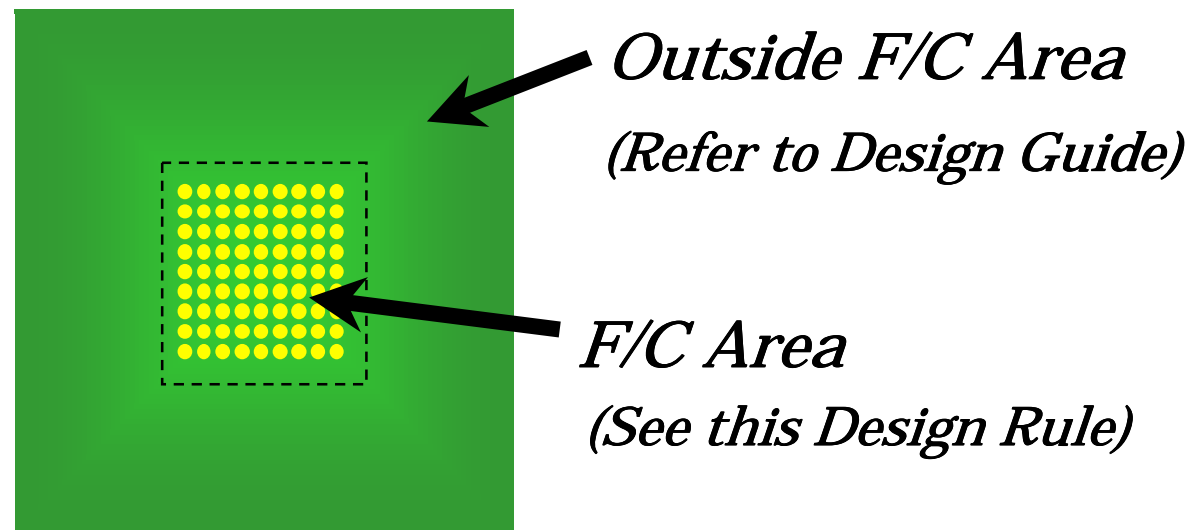
<UNIT:um>

#	Item	Production	
		Standard	Custom
1	Flip chip pad diameter (Solder resist opening)	100	90
2	Flip chip pad metal land diameter	145	130
3	Flip chip pad pitch	225	150
4	Solder bump height	32 +/- 30	

Internal Design Rule

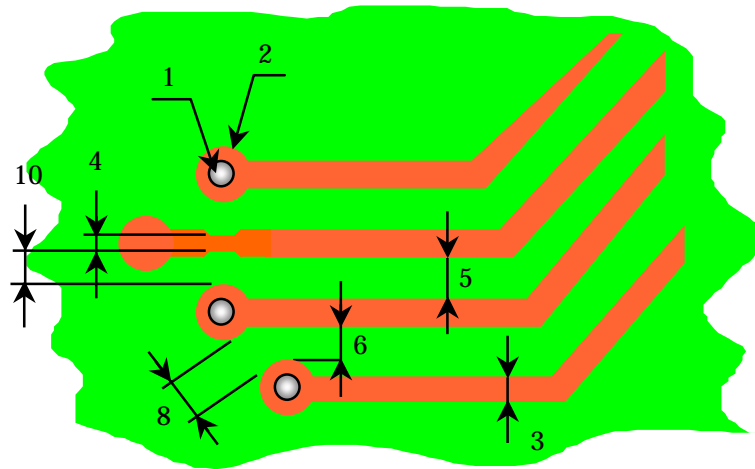
Design Rules are separated into “Fine Rule” Area & “Regular Rule” Area for better productivity.

- * Flip Chip Area : “Fine Rule” Area*
- * Outside Flip Chip Area : “Regular Rule” Area*

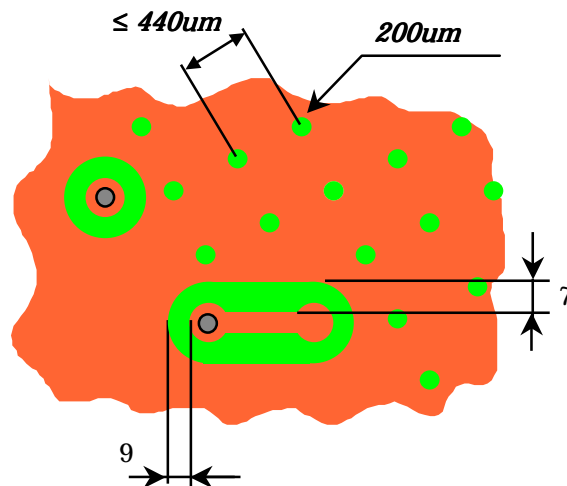


Build up layer design rule

Flip Chip Area (Fine Design Rule Area)



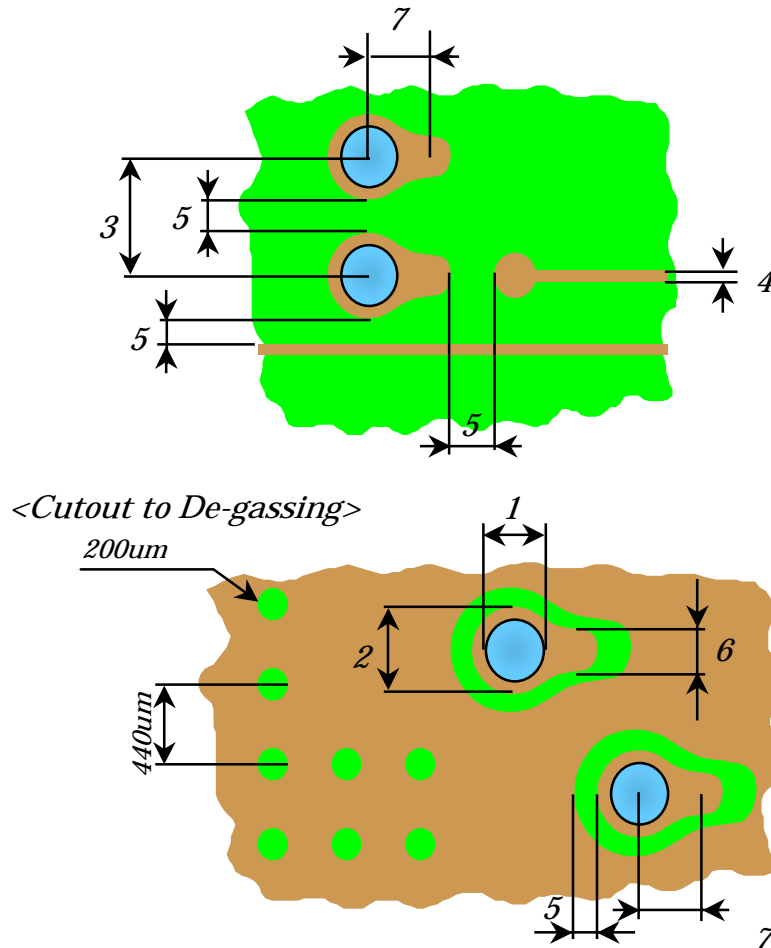
<De-gassing Hole>



<UNIT:um>

#	Item	Production	
		Standard	Custom
1	Via Dia. (Laser Via)	75 Laser	65 Laser
2	Cover pad Dia.	115	105
3	Line width	30	25
4	Neckdown Line width	25	20
5	Line to Line space	30	25
6	Line to Pad space	25	25
7	Line to Plane space	30	30
8	Pad to Pad space	25	25
9	Pad to Plane space	30	30
10	Neckdown Line to Pad space	25	20
11	Plane to Plane space	50	50

Core layer design rule



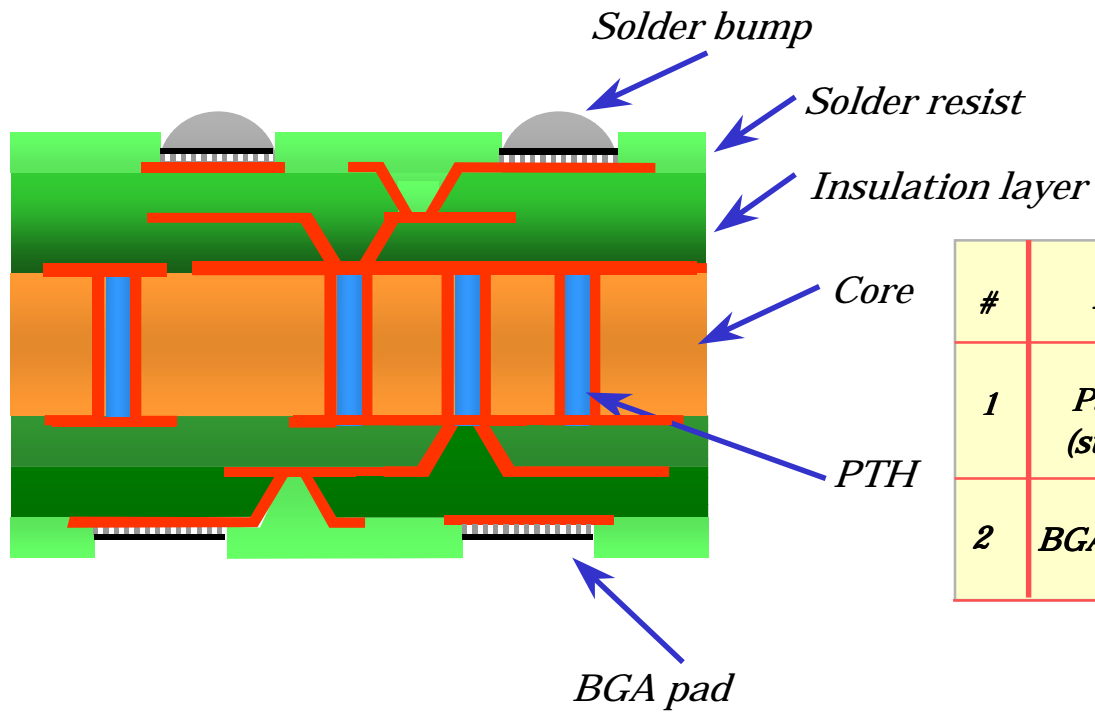
<UNIT:um>

#	Item	Production	
		Standard	Custom
1	PTH diameter	300	250
2	PTH cover land diameter	500	450
3	PTH Pitch	600 Min	540 Min
4	Trace width	100 Min	90 Min
5	Space	100 Min	90 Min
6	Via cover land diameter	200	180
7	PTH pad to Via pad pitch	350 Min	315 Min

Note : Item 7 mean "Not overlap PTH cover pad and Via pad".

BGA pad

Structure section view

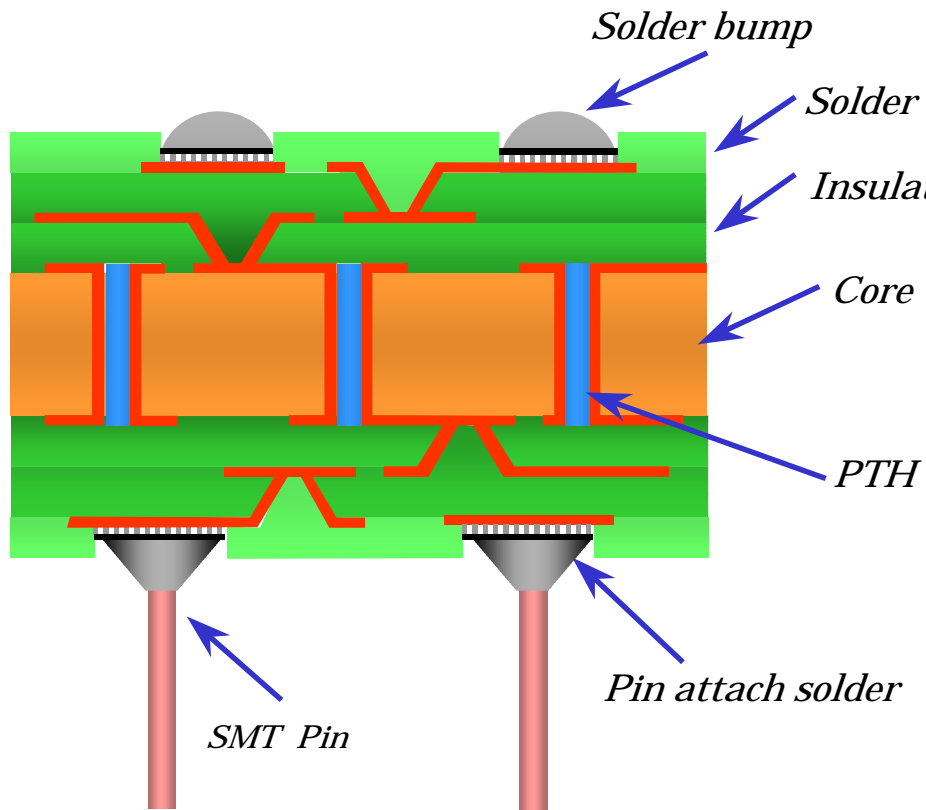


BGA pad

#	Item	OBGA (OLGA)		
1	Pad pitch (straight)	0.8mm	1.00mm	1.27mm
2	BGA diameter	0.45mm	0.53mm -0.55mm	0.63mm -0.70mm

Pin attachment

Structure section view



Pin

#	Item	OPGA	uOPGA
1	Pin pitch	2.54mm staggered	1.27mm straight
2	Pin diameter	0.46mm	0.30mm
3	Pin material	Kovar	Alloy 194